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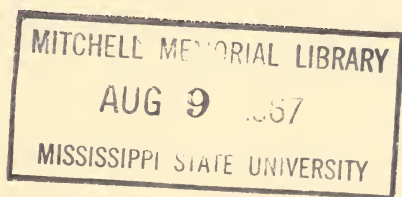
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Recommendations for 1963

Weed Control In Soybeans



MISSISSIPPI STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION

HENRY H. LEVECK, Director

Nomenclature of Chemicals Used as Herbicides

This list of herbicides is intended only as an aid in obtaining the chemicals. Use of trade names does not imply endorsement of a product by the Mississippi Agricultural Experiment Station or the United States Department of Agriculture, and such names are given only for herbicides which at the time of release of these recommendations, are marketed under the trade names listed only.

Common Name	Chemical name of active ingredient	Trade Name
Amiben	3-amino-2,5-dichlorobenzoic acid	Amiben
Dalapon	2,2-dichloropropionic acid	Dowpon
Linuron	3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea	Lorox
NPA	N-1-naphthylphthalamic acid	Alanap
herbicial naphtha	A petroleum naphtha sold for use in soybeans or cotton	Several Mfrs.
4-(2,4-DB)	4-(2,4-dichlorophenoxy) butyric acid	Buroxone SB Butyrac 118 Butyrac 175
surfactant	Highly variable; comparative evaluation data by chemical type are very limited. Only nonionic agricultural surfactants sold specifically for use with herbicides are recommended.	Several Mfrs.

CAUTION

The manufacturer's label gives the number of pounds of active material per gallon of the herbicidal concentrate, or for powders, the percentage of active ingredients. Instructions on the manufacturer's label pertaining to usage and to personal hazards in handling should be read and strictly observed.

WEED CONTROL RECOMMENDATIONS FOR SOYBEANS IN 1963

By C. G. McWHORTER, V. C. HARRIS, and J. W. McKIE¹

The weed problem in soybeans may develop in early season, late season or may develop progressively throughout the season. Goosegrass, crabgrass, brachiaria, pigweed, and other small-seeded weeds usually constitute the early-season problem. Cocklebur and morningglory often develop in late season and greatly lower

combine efficiency. Johnsongrass competes with soybeans throughout the growing season, lowers yields, reduces quality, and often causes substantial delays in harvesting. Since soybeans are planted in late spring or early summer, preplanting control measures may be used for Johnsongrass control that would not be suitable for use in certain other crops.

PREPLANTING METHODS OF WEED CONTROL

Johnsongrass

An application of dalapon as a post-emergence foliage treatment on emerged Johnsongrass prior to planting soybeans or repeated preplanting cultivation is recommended for the control of established Johnsongrass in fields to be planted to soybeans. Neither of these practices will provide 100 percent control nor will they provide control of Johnsongrass seedlings which germinate after soybeans are planted. If either of these preplanting weed control practices are used a suitable pre-emergence herbicide should be applied after the soybeans are planted and before they emerge to aid in the control of seedling Johnsongrass to prevent reinfestation.

Combination chemical-Minimum Cultivation method. Dalapon should be applied at 3.7 to 5.5 lbs/A as a preplanting broadcast foliage spray to actively growing Johnsongrass at least 3 weeks prior to planting soybeans. Increased control will be obtained if a surfactant is added to the spray mixture at the rate of one half pint of surfactant per 50 gallons of total spray. Dalapon should be applied broadcast only to areas heavily infested with Johnsongrass.

Fields with spot-infestations can be sprayed with hand or conventional trac-

tor equipment. Johnsongrass treated with a foliage application of dalapon should be disked 4 to 7 days after herbicide application so as to remove all above-ground plant growth. If the soil is hard and packed when this disking is applied so that the soil is poorly mixed and the Johnsongrass only partly cut, the disking should be repeated. It is important that the soil be thoroughly mixed. Soybeans should not be planted until 2½ weeks after this disking. Johnsongrass that emerges during the 2½ weeks period between disking and soybean planting should be removed by additional disking or by cultivation with overlapping flat sweeps be-

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fore the Johnsongrass plants reach "boot" stage.

Dalapon applied as a postemergence foliage spray to emerged Johnsongrass prior to planting soybeans will normally provide sufficient Johnsongrass control to result in increased soybean yields that will produce a larger net profit. When this treatment is used for the first time a small untreated area adjacent to the treatment area should be compared to determine the success and value of the treatment.

Dalapon applied preplanting as recommended will usually give less residual late-season control of Johnsongrass than will the intensive cultivation method described below. The use of the dalapon treatment however is not as dependent on long periods of limited rainfall for success nor does the use of dalapon tie up equipment for long periods as does the intensive cultivation method.

Cultural, Intensive Cultivation Method:

Johnsongrass can also be controlled with 6 to 10 fallow-cultivations prior to planting soybeans. A diskharrow appears to be slightly more effective than a field cultivator for Johnsongrass control. Alternate usage of the two implements is equally effective as disking alone and will be more economical than use of a disk for all cultivations. Six to 10 cultivations at 4 to 8 day intervals should be applied in a 4 to 6 week period prior to planting.

If excessive rainfall prevents the application of these treatments at uniform intervals throughout the 4 to 6 week period,

disk cultivations should be applied twice to the same field on the same day and repeated whenever possible until a total of 6 to 10 cultivations are applied.

The number of cultivations necessary for a given level of control will depend on the severity of the Johnsongrass infestation and the level of soil moisture present during the preplanting period. Since relatively dry soil conditions are necessary for optimum control using intensive cultivation, dalapon used as previously described will be more effective for Johnsongrass control under prolonged wet periods. Eight or 10 diskings will probably provide a longer period of good control than will the dalapon treatment but intensive cultivation requires the use of large amounts of farm machinery on a relatively strict schedule.

There does not appear to be an economic advantage from use of both dalapon and intensive fallow-cultivation preplanting. Either one or the other should be used but not both on the same field.

Annual Weed Control

Since soybeans are planted in late spring or early summer, shallow preplanting cultivation may be used as a means of controlling one or more crops of early weeds. Very shallow disking, plowing, use of harrows or rotary hoes or tillers should destroy the weeds and form a shallow mulch. Where annual weeds such as crabgrass, *Brachiaria*, goosegrass, pigweed, and annual morningglory present early-season weed problems the use of herbicides may be warranted. Pre- and postemergence treatments are recommended for controlling these weeds.

PREEMERGENCE METHODS OF WEED CONTROL

Amiben is recommended for use on soils having textures of medium sandy loam to clay. NPA is recommended on soils having textures of medium sandy loam to clay loam. Linuron² is a new

preemergence herbicide which is recom-

²As of January 1, 1963 label restrictions under Public Law 518 restrict the use of linuron to soybeans grown for seed purposes.

mended for trial use on soybeans grown for seed purposes only. This herbicide has been very promising in experimental work for 2 years and is recommended only for trial use on soils having textures of medium sandy loam to clay. Since linuron is a new herbicide it should be applied only to as much acreage as the farmer is willing to have injured by the herbicide. Rates of amiben, linuron, and NPA are presented in Table 1.

None of these herbicides should be applied preemergence to soybeans on light textured sandy soils. Regardless of the soil type the soybean seed should be covered at least one inch deep but additional protection will be obtained against possible herbicide injury if the seed are planted deeper. Soybean injury may be obtained with any of the recommended herbicides and particularly with NPA.

In most instances soybean injury from these preemergence herbicides probably will not reduce crop yields if the recommended rates are applied to the proper soil type. Reduced weed control and some complete failures can be expected if the herbicides are applied to dry soil and 1 to 2 or more weeks elapse before rainfall occurs.

Amiben and linuron will generally provide better preemergence control of most weeds but especially of seedling Johnsongrass and cocklebur than NPA. If the primary weed problem is caused by cocklebur and seedling Johnsongrass the recommended rates listed in Table 1 should be increased 25 percent. It should be realized that even these increased preemergence rates will not provide perfect control of weeds such as cocklebur which can germinate and emerge from a depth of 4 inches or deeper.

Table 1.—Rates of amiben, linuron, and NPA for preemergence weed control in soybeans.

Soil texture	lb/A on 12-inch band ¹		
	Amiben	Linuron	NPA
Medium sandy loams	0.6	0.3	0.6
Very fine sandy loams	0.8	0.5	0.9
Silt loams	0.9	0.6	1.2
Clay loams	1.1	0.8	1.8
Clay	1.3	1.0	...

¹Applied only where rows are 40 inches wide.

POSTEMERGENCE METHODS OF WEED CONTROL

Cultural Methods

Conventional Cultivation of Weeds in Row Middles: This long used practice needs little explanation. It consists of the use of sweeps to throw soil into the drill area for the purpose of smothering young weeds. **It should not be used** if the control of weeds by a previous chemical is essentially complete, nor if the use of further postemergence oil is planned. If, however, oil cannot be used, and the control of weeds is not essentially complete, "dirtting cultivation" **should be used.**

"Dirtting cultivation," where properly used, is usually beneficial rather than detrimental to a chemical weed-control program. Failure to "dirt" or delaying "dirtting" when it is needed is as detrimental to a successful program as is "dirtting" when it is not needed. Care should be taken to avoid deep cultivation (which will prune the roots of the soybeans), and even shallow cultivation should be used no more often than necessary for weed control.

Rotary Hoeing: A rotary hoe may be used as soon as soybeans are up to a stand and repeated as needed at about 5-day intervals. Rotary hoeing is most effective when weeds are breaking through a slightly crusted soil but will give very little control if the soil is damp or wet. Rotary hoeing is generally a highly economical practice in terms of the weed control obtained as compared to the investment.

When soybeans are in the first trifolium (one pair of true leaves) or second trifolium leaf stage (two pair of true leaves) the rotary hoe should be used after the plants have lost some of their turgidity (slightly wilted). This usually occurs in late morning or near noon. Some weed control may be obtained from rotary hoeing soybeans in the third trifolium although weeds are generally too large and too well rooted to be effectively controlled at this stage of growth. Yield reductions may be obtained if soybeans are rotary hoed after the third trifolium is fully expanded.

Chemical Methods

Herbicidal oils: A single directional application of herbicidal oil at 5 gallons per acre 12 to 16 days after soybean emergence and when weeds are 1 to 3 inches tall has been effective in controlling early season weeds. Under no conditions should the rate of 5 gallons per acre be exceeded or the oil applied at other stages of soybean or weed growth. Only naphtha type oils which have been proved satisfactory by research on selective weed control in cotton should be used. No fortifying agent should be present, and these recommendations are restricted to unfortified naphthas that are sold specifically for weed control in cotton or soybeans after successful field research and use.

In relatively level fields where herbicidal oils are to be used the seedbeds should be low and flat on top after planting. Rotary hoes should not be used prior to the

application of herbicidal oil since their use makes the row surface very rough. At least 16 inches centered over the drill should be level, smooth, free of clods, presswheel marks, and other obstructions.

Normally two nozzles per row are used. One nozzle should be used on each side of the row and each nozzle should be 5 inches from the drill center. The two nozzles should be spaced and directed so as to prevent the two spray patterns from meeting head-on, as this might cause an objectionable deflection of the spray. Nozzles should be set so that the spray fan is horizontal and strikes the young soybean stem no higher than 1 inch from the ground level and gives adequate coverage of the weeds. The nozzles should be set so that they are 1 inch or less above the soil.

A slight downward tilt may be given to the nozzles to increase the ease of keeping oil off the soybean leaves. If the downward tilt is excessive most of the oil will be undesirably concentrated on the ground at the base of the soybean stems and the band treated will be too narrow. The oil should settle in the 8- to 10-inch band centering on the drill.

Although two nozzles per row can be used successfully, the use of an additional pair set to spray the shoulder of the row will increase the ease of the operation. The additional oil needed for these two nozzles will, however, double the per-acre cost of the oil. These nozzles should be set to spray parallel to the row and the pattern should extend slightly (2 to 2½ inches) into both the area to be cultivated and the area being sprayed by the other pair of nozzles.

The importance of keeping the oil on the lowest inch of the soybean stem cannot be over-stressed. Oil applied high on the stem, on the bud, or on the leaves will seriously injure or kill young soybean plants.

Farmers having used herbicidal oil for

weed control in cotton will experience little difficulty in applying herbicidal oil to soybeans. Anyone who wants to use this practice in soybeans and does not have previous experience with oiling should proceed with caution and apply herbicidal oil only to a limited acreage the first year.

Phenoxy Herbicides

Cocklebur can be controlled in soybeans with amine salt formulations of 4-(2,4-DB). This material should be applied as a broadcast postemergence spray over the crop at a rate of 0.2 pounds per acre in a total volume of 10 to 20 gallons of water per acre. Treatments can be applied from two weeks prior to early soybean bloom until mid bloom. Best cocklebur control is obtained if 4-(2,4-DB) is applied after cocklebur plants have elongated and are equally as tall as the soybean plants or taller. This usually occurs before early soybean bloom.

Yield reductions from 4-(2,4-DB) may occur if the herbicide is applied to soybeans after early bloom that are not heavily infested with cocklebur. If cocklebur occurs in small spotted infestations throughout a field these areas should be treated on a spot basis and the herbicide not applied to cocklebur-free soybeans. Spot treatments may be made with either hand spray equipment or with a conventional tractor-mounted-boom sprayer, cut-

ting the spray off when traveling over uninfested areas. An effort should be made to apply 4-(2,4-DB) to fields thinly infested with cocklebur at least 7 to 10 days prior to early bloom.

If soybeans are planted during the first two weeks in May, Hill soybeans will normally be expected to start blooming the first week in July, Lee soybeans the second week in July, and Jackson soybeans will normally bloom the third week in July. If Lee or Jackson soybeans are planted in the first ten days of June they will normally start blooming the first week of August.

If the cocklebur infestation is heavy and these weeds form a canopy over the soybeans the date of application of 4-(2,4-DB) is not as critical since the weeds will prevent most of the sprays from reaching the soybeans. Generally as the level of cocklebur infestation increases the soybean injury obtained decreases.

Farmers who use 4-(2,4-DB) for the first time should realize that this herbicide causes injury to soybeans but injury symptoms (pronounced stem curvature drooping leaves) generally disappear within one week after treatment. Injury is usually more severe if the chemical is applied to soybeans growing in very dry soil. Little or no control of weed species such as morningglory, pigweed, and coffeebean will be obtained from the recommended rate of 4-(2,4-DB).